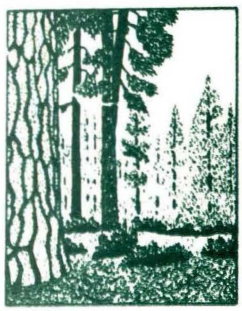

FOREST RESEARCH NOTES

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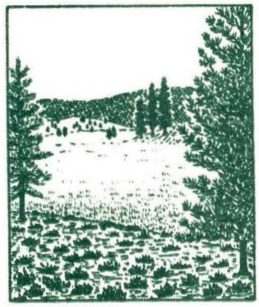

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WATERSHED MANAGEMENT CONSIDERATIONS FOR SANITATION-SALVAGE LOGGING IN SOUTHERN CALIFORNIA[1/]

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Southern California's pine forests contain a great many old, overmature trees. The timber manager likes to see these old trees harvested to make room for younger, faster-growing ones. The forest entomologist wants them removed before they create an insect epidemic. Still others favor sanitation-salvage logging because dead and dying trees are a great fire hazard and an ugly sight and even dangerous to the family that goes to the forest for recreation.

What does the watershed manager think about sanitation-salvage logging and watershed management? Does this kind of logging affect our water supply? The situation is something similar to what happens when your house is on fire: The fireman chops a hole in the door to get at the fire and save the house. In sanitation-salvage, we make holes in the watershed cover--we disturb some of the soil--to bring about other benefits.

The watershed manager considers sanitation-salvage logging a help when it is done properly. Probably its greatest benefit is indirect. It helps maintain a healthy stand of trees for watershed cover, and it helps fight fire--one of the worst enemies of the watershed. Cutting high risk trees and snags reduces the fire hazard within the stands and logging roads provide access for fire fighters.

The logger's job, then, is to get the trees out yet disturb the soil and plant cover as little as possible. Some good advice on

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1/ Presented at annual meeting, Southern California Section Society of American Foresters, San Bernardino, December 7, 1956.

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how to do the job has been provided by Cosens[2] and Briegleb[3] in their work in the Sierra Nevada and the Pacific Northwest. McRorey, Meadowcroft and Kraebel[4] published a guide on this subject, and the timber management staffs on the southern California national forests, considering the varied interests at stake, have spelled out several essentials basic to good watershed management.

All these workers found that a successful logging job hinges on effective advance planning. The forester and the logger should carefully work out a logging plan--plans for roads, skid trails, and landings--before sanitation-salvage logging actually starts. Then they can efficiently and easily coordinate forestry and logging phases of the operation; they won't have to improvise and go back and adjust road and landing locations after logging begins. Another thing about advance planning: It helps you drive home to the loggers the watershed values at stake. This is of great importance. The men in the woods must understand that their job is to reduce damage to the watershed as well as to get out the logs.

What does this advance planning accomplish? A more efficient operation and less wear and tear on the watershed.

Aerial photos, especially when used in stereo, and a topog map are a big help in selecting tentative locations for roads, landings, turn-arounds, and the area to be served by each landing. Then when the forester and logger scout the area, they can mark the final locations on a map on the ground.

Much stream siltation can be avoided by proper road location. Roads placed back from live or intermittent streams keep dirt from construction out of the channel. Where this is not possible--as at stream crossings--water level crossings (stabilized dips), temporary bridges, or other drainage structures help prevent interference with the flow of the stream.

In steep terrain, use of a dry channel for a short distance may result in less soil movement than grading a tractor road on the slopes, but be sure to re-grade the channel and clear it of slash after logging to permit full streamflow in the wet season. No logs

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2/ Cosens, R. D. Reducing logging damage, Calif. Forest and Range Expt. Sta. Research Note 82. 10 pp., illus. 1952.

3/ Briegleb, Philip A. Applied forest management in the Douglas-fir region, Pacific Northwest Forest and Range Expt. Sta. Research Note 71. 9 pp. 1950.

4/ McRorey, R. P., Meadowcroft, N. F., and Kraebel, C. J. A guide to erosion reduction on national forest timber sale areas. California Region, Forest Service, U. S. Dept. Agri. 78 pp., illus.

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or chunks should be left in a gulch bottom in such a position that the channel will be plugged or that water will be diverted against either bank; otherwise, the diverted stream can erode the toe of the slope or cause waterfalls to gouge out the channel bottom.

Keep the amount of earth moved in road construction to a minimum. Frequently, the amount of cutting and filling necessary can be greatly reduced by laying out a slightly rolling grade instead of a sustained grade, without significantly reducing the traffic-carrying capacity of the road. An undulating road will also divert runoff every now and then and thus reduce erosion of ditches and roadbeds. Care and good timing in building roads can prevent much soil from moving into waterways. Construction during dry periods not only causes less erosion, but as every logger knows, is cheaper. During periods of heavy runoff, assign a man with a shovel to divert streams of water that run over the roadway. This will avoid a great deal of sedimentation from road construction, and should be continued after the road is in use--until the surfaces are hard and safe and new drainage patterns are well stabilized.

Plan skid-trail locations before logging with four main objectives. First, make the trails service the entire landing area so there will be no call for additional trails at the time of logging. Second, keep the number of trails to a minimum, with branch trails joining the main ones as soon as feasible. The less trail you build, the less erosion and the less the logging job costs. Third, keep channel crossings to a minimum. For example, good management can call for two landings located relatively close together--one on the north side of the stream and the other on the south side. Locate trails as far away from the stream edge as practicable in order to minimize disturbances on or near stream banks. Fourth, locate the trails to avoid long or steep adverse grades, unnecessary distances, and sharp turns. Confine skidding to these trails except for the actual pick-up of logs.

Locate landings in natural, level openings and on firm dry ground whenever possible. In moderate terrain this is easily attained; in steep country careful designation of landing sites is necessary to minimize watershed damage. Often you can make landings by widening the haul roads at some distance from water courses. Cribbing built with cull or unmerchantable logs and chunks on the downhill side will support a landing fill and thus minimize excavation.

Fell the trees away from drainage channels to keep the slash out of waterways. Limb the logs before yarding. Be sure the loggers know the location of the skid trails. Then, they can place the trees so that yarding crews can roll and skid the logs with a minimum amount of soil disturbance.

Slash disposal is often considered solely as a method of reducing fire hazard. Don't overlook the opportunity, however, for using slash from tops and other debris to minimize or prevent erosion damage. Slash and litter properly placed in skid trails will lessen

soil movement and divert excess water out of trails; improperly placed, it is ineffective, wasteful of effort, and may even increase erosion. Place the material in good contact with the soil and the larger pieces at such angles that they will lead water out of the skidway at frequent intervals. Portable chippers, now in use on two of the southern California national forests, will chip slash and blow a mulch into old skid trails and other bare and unstable areas. In general, the combination of good road location, well-placed waterbreaks, and slash placement in critical spots, will provide effective erosion protection.

Good road location with an eye to the future usually means easier maintenance. Primary roads built by the logger and maintained after logging make more recreation areas available and serve as fire access roads. Temporary roads, tractor roads, and trails should be "put to bed" at the end of the season so that water will not rush down the ruts. Blade off the berm, remove temporary fills, and install water bars in the roadways at intervals so that water will be led off and spread over undisturbed soil before it can attain enough volume and velocity to cause serious erosion.

At present most of the southern California sanitation-salvage logging areas are on the less critical slopes and on rather deep, fairly stable soils. On the steeper, more erosible slopes, logging cannot be tolerated unless it can be conducted with little or no soil disturbance. This may become possible, however, through some adaptation of a gravity cableway system.

Now, to summarize the main considerations:

1. Carefully plan roads, skid trails, and landings before logging is started.

2. Be sure the loggers understand the watershed values at stake.

3. Locate roads and trails away from stream channels.

4. Keep earth moving to a minimum. Keep road and trail mileage as low as possible.

5. Keep channel crossings to a minimum.

6. Avoid long or steep grades.

7. And after logging, put temporary roads and trails "to bed" and place slash and litter so that runoff velocities and soil movement are kept to a minimum.